


**Biological Evaluation  
of  
Sensitive Plant Species  
for the  
Motorized Travel Plan Project  
Preferred Alternative with Modifications**

**Dixie National Forest**

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## I. Introduction

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This Biological Evaluation (BE) analyzes the effects of the proposed action, the **Motorized Travel Plan Preferred Alternative with Modifications** project (herein after referred to as PAWM or proposed action), on species listed as Sensitive on the Regional Forester's Sensitive Plant Species List for the Intermountain Region (Region 4), and to determine whether the effects on these species would result in a trend toward becoming Federally listed.

Formal objectives of this Biological Evaluation (BE) include:

- Identify sensitive species that would be affected by the proposed project (FSM 2672.42).
- Ensure that Forest Service actions do not result in the loss of viability of any native or desired non-native plant or animal species, or create significant trends toward Federal listing of any species (FSM 2672.41).
- Provide a process and standard that ensures that sensitive species receive full consideration in the decision making process (FSM 2672.24b-2676.17e).
- To maintain a project file on actions regulated under the Environmental Policy and Procedures Handbook FSH 1909.15 chapter 30.

Regional sensitive plant species that occur or have potentially suitable habitat on the Dixie National Forest are listed in Table 1.

**Table 1. Regional sensitive plant species that occur or have potentially suitable habitat on the Dixie National Forest. (Table based on information found in R4 Regional Foresters' Sensitive Species List (USDAFS 2003), Rodriguez 2008, Atwood et al. 1991, Madsen 2009, and the Dixie National Forest Rare Plant Database – updated 2009 (USDAFS 2009))**

Sensitive Plant Species ( <i>Scientific name</i> )	Habitat Suitability Based On:	Further Analysis?*	Presence & Ranger District Location
Angell cinquefoil ( <i>Potentilla angelliae</i> )	Endemic in Wayne County on the Boulder Top in rocky subalpine meadows at about 10,900-11,300 feet elevation.	Yes	Only occurs on the Teasdale Ranger District (D5)
Aquarius paintbrush ( <i>Castilleja aquariensis</i> )	Endemic to the Aquarius Plateau, Garfield and Wayne counties, in sagebrush and grass meadow communities adjacent to aspen-subalpine fir on clay-loam soils at about 9,800-11,000 feet elevation.	Yes	Only occurs on the Escalante and Teasdale Ranger Districts (D4,D5)
Arizona willow ( <i>Salix arizonica</i> )	Found in riparian corridors above 8,500 feet elevation in unshaded or partially shaded wet meadows and streamsides.	Yes	Only occurs on the Cedar City, Powell, and Teasdale Ranger Districts (D2,D3,D5)
Bicknell thelesperma ( <i>Thelesperma subnudum</i> var. <i>alpinum</i> )	Endemic to Wayne County; restricted to the Navajo Sandstone and Carmel Formation on the peculiar vari-colored phase in pinyon-juniper, mountain brush, and bristlecone pine communities at 7,380-9,000 feet elevation.	Yes	Only occurs on the Teasdale Ranger District (D5)
Cedar Breaks biscuitroot ( <i>Cymopterus minimus</i> )	Bristlecone, ponderosa pine, and spruce-fir communities on escarpments on Wasatch Limestone at 8,000-10,400 feet elevation.	Yes	Only occurs on the Cedar City, Powell, and Escalante Ranger Districts (D2,D3,D4)
Pinnate spring-parsley ( <i>Cymopterus beckii</i> )	Pinyon-juniper, mountain brush, and ponderosa pine communities in sandy canyon bottoms or cliff crevices between 5,500 and 9,000 feet elevation.	Yes	Only occurs on the Teasdale Ranger District (D5)
Cliff jamesia ( <i>Jamesia americana</i> var. <i>zionis</i> )	Mountain brush and spruce-fir communities, mostly on cliffs and other rocky places at 4,000-10,500 feet elevation.	No	Not known to occur on the Dixie National Forest
Creeping draba ( <i>Draba sobolifera</i> )	Endemic to the Tushar Mountains in alpine tundra and spruce-fir communities in igneous gravels and talus at 7,500-12,000 feet elevation.	No	Not known to occur on the Dixie National Forest
Dana milkvetch ( <i>Astragalus henrimontanensis</i> )	Endemic to southcentral Utah in Garfield County in ponderosa pine, pinyon-juniper, and sagebrush communities on gravelly loam soil at 7,000-9,200 feet elevation.	Yes	Only occurs on the Escalante Ranger District (D4)
Guard milkvetch ( <i>Astragalus zionis</i> var. <i>vigulus</i> )	Endemic to the east side of the Pine Valley Mountains in pinyon-juniper, mountain mahogany, and oak- <i>Garrya</i> communities at 5,000-8,200 feet.	Yes	Only occurs on the Pine Valley Ranger District (D1)
Jones goldenaster ( <i>Heterotheca jonesii</i> )	Found in Garfield, Kane, and Washington counties on ponderosa pine, manzanita, pinyon-pine, and Douglas-fir communities on sandstone or in sand between 4,000 and 9,450 feet elevation.	Yes	Only occurs on the Escalante Ranger District (D4)

<b>Sensitive Plant Species</b> ( <i>Scientific name</i> )	<b>Habitat Suitability Based On:</b>	<b>Further Analysis?*</b>	<b>Presence &amp; Ranger District Location</b>
Little penstemon ( <i>Penstemon parvus</i> )	Endemic in Garfield, Piute, Sevier, and Wayne counties in sagebrush-grass, and spruce communities between 8,200 and 10,170 feet elevation.	Yes	Only occurs on the Escalante and Teasdale Ranger Districts (D4,D5)
Maguire campion ( <i>Silene petersonii</i> )	Ponderosa pine, Rocky Mountain juniper, bristlecone pine, and spruce-fir, on open calcareous escarpments between 6,955 and 11,200 feet elevation.	Yes	Only occurs on the Cedar City, Powell, and Escalante Ranger Districts (D2,D3,D4)
Navajo Lake milkvetch ( <i>Astragalus limnocharis</i> var. <i>limnocharis</i> )	Found in plant communities with scattered bristlecone pine on the Wasatch Limestone Formation between 8,800 and 10,500 feet elevation. Endemic to the west side of the Markagunt Plateau.	Yes	Only occurs on the Cedar City Ranger District (D2)
Neese's peppergrass ( <i>Lepidium montanum</i> var. <i>neeseae</i> )	Endemic to southcentral Utah in Garfield County on dry, sandy sites with little cover in ponderosa pine, manzanita, and spruce-fir communities. Typically found on the Tertiary Claron Formation and Navajo Sandstone Formation at elevations of 7,300-9,000 feet.	Yes	Only occurs on the Escalante Ranger District (D4)
Paradox moonwort ( <i>Botrychium paradoxum</i> )	Meadow habitats and snowfields, at elevation between 9,000 and 10,000 feet.	Yes	Only occurs on the Escalante and Teasdale Ranger Districts (D4,D5)
Paria breadroot ( <i>Pediomelum pariense</i> )	Endemic in Garfield, Washington, and Kane counties on ponderosa pine and pinyon-juniper communities on calcareous or sandy soils of the Kaiparowits Formation between 5,575 and 8,000 feet elevation.	No	Not known to occur on the Dixie National Forest
Pine Valley goldenweed ( <i>Haplopappus crispus</i> )	Endemic to the Pine Valley Mountains at elevations of 5,970-9,200 feet. Occurs in moderately open areas in association with ponderosa pine, manzanita, fir, and aspen.	Yes	Only occurs on the Pine Valley Ranger District (D1)
Pinyon penstemon ( <i>Penstemon pinorum</i> )	Occurs in the Pine Valley Mountains in pinyon-juniper communities between 5,600 and 5,800 feet elevation.	Yes	Only occurs on the Pine Valley Ranger District (D1)
Podunk groundsel ( <i>Senecio malmstenii</i> )	Endemic on the Markagunt, Paunsaugunt, Table Cliff and Horse Creek Top plateaus in Iron, Kane, and Garfield counties in bristlecone pine, spruce-fir, and mixed conifer woodlands on steep talus slopes of the Claron Limestone at about 8,790-10,512 feet elevation.	Yes	Only occurs on the Cedar City, Powell, and Escalante Ranger Districts (D2,D3,D4)
Rabbit Valley gilia ( <i>Gilia caespitosa</i> )	Endemic to Wayne County on pinyon-juniper communities on the Carmel and Navajo formations between 5,200 and 8,515 feet elevation.	Yes	Only occurs on the Teasdale Ranger District (D5)
Red Canyon beardtongue ( <i>Penstemon bracteatus</i> )	Endemic in Garfield County on ponderosa pine, pinyon-juniper, limber pine, and bristlecone pine-manzanita communities on the pink and white limestone members of the Wasatch Limestone Formation between 6,900 and 8,320 feet elevation.	Yes	Only occurs on the Powell and Escalante Ranger Districts (D3,D4)

<b>Sensitive Plant Species (Scientific name)</b>	<b>Habitat Suitability Based On:</b>	<b>Further Analysis?*</b>	<b>Presence &amp; Ranger District Location</b>
Reveal paintbrush ( <i>Castilleja parvula</i> var. <i>revealii</i> )	Ponderosa pine/bristlecone pine community on gravelly soils of the Wasatch Limestone Formation between 7,500 and 8,300 feet elevation.	Yes	Only occurs on the Cedar City, Powell, and Escalante Ranger Districts (D2,D3,D4)
Rock tansy ( <i>Sphaeromeria capitata</i> )	Disjunct populations in Garfield County on bristlecone pine on Tertiary Claron Formation at 5,000-7,800 feet elevation.	Yes	Only occurs on the Powell Ranger District (D3)
Table Cliff milkvetch ( <i>Astragalus linnocharis</i> var. <i>tabulaeus</i> )	Endemic to south-central Utah in Garfield County on steep, unstable slopes of the Wasatch Limestone Formation at 9,200-10,170 feet elevation.	Yes	Only occurs on the Escalante Ranger District (D4)
Tushar paintbrush ( <i>Castilleja parvula</i> var. <i>parvula</i> )	Alpine areas on igneous gravels and outcrops at elevation between 10,000 and 12,100 feet.	No	Not known to occur on the Dixie National Forest
Widtsoe buckwheat ( <i>Eriogonum aretioides</i> )	Endemic to central Garfield County on bristlecone pine, ponderosa pine, Douglas-fir, and Rocky Mountain juniper communities on the pink member of the Wasatch Limestone Formation between 7,400 and 8,710 feet elevation.	Yes	Only occurs on the Powell and Escalante Ranger Districts (D3,D4)
Yellow-white catseye ( <i>Cryptantha ochroleuca</i> )	Associated with pinyon-juniper, ponderosa pine, and bristlecone pine communities on the pink member of the Wasatch Limestone Formation, between 6,500 and 9,000 feet.	Yes	Only occurs on the Powell and Escalante Ranger Districts (D3,D4)

\*Yes - The proposed project's potential effects on these species will be further analyzed in this document.

\*No – No further analysis is necessary, and a determination of “No impact” is rendered.

## II. Current Management Direction

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Current policy as stated in the Forest Service Manual (FSM 2672.1) includes the following: Sensitive species of native plant and animal species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing.

The management direction specified by the Dixie National Forest Land and Resource Management Plan (Forest Plan) is to manage classified species' habitat to maintain or enhance their status through direct habitat improvement and agency cooperation and to manage and provide habitat for recovery of endangered and threatened species (Dixie LMRP 1986).

### **III. Description of the Proposed Action**

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The action proposed by the Dixie National Forest to meet the purpose and need is to designate a motorized travel system that addresses the following four components:

1. Cross-country travel.
  - a. Prohibition of motorized cross-country travel (travel off designated roads or trails) except as specified for permitted uses (e.g., firewood gathering, allotment maintenance), emergency fire suppression, search and rescue activities, law enforcement activities, military operations, and Forest Service administrative uses and purposes.
2. Designation of authorized National Forest System roads and motorized trails.
  - a. Closure of currently authorized routes that will not be designated for motorized use and will therefore be removed from the National Forest System of roads and motorized trails. All routes removed from the system will be decommissioned.
  - b. Designation of unauthorized routes that will be added to the National Forest System of roads and motorized trails, thereby becoming authorized routes.
3. Designation of authorized uses of National Forest System roads and motorized trails.
  - a. Designation of routes that will be open to all uses.
  - b. Designation of routes needed to accommodate administrative activities and permitted uses.
  - c. Designation of routes needed for access to private lands, rights-of-way, easements, and other jurisdictions.
  - d. Designations of routes with seasonal restrictions or routes that only allow certain types of vehicles.
4. Construction or relocation of designated National Forest System roads and motorized trails.
  - a. Construction or relocation of routes to improve the transportation system or to respond to evaluation findings.

As authorized by section 212.50 (b) of the Travel Rule, previous and pending decisions that allow, restrict, or prohibit motor vehicle use on National Forest System roads, trails, or areas have been incorporated into this travel management decision.

### **IV. Description of the Project Area**

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The project area comprises the entire Dixie National Forest and the Teasdale portion of the Fremont River Ranger District, now administered by the Fishlake National Forest.

## V. Existing Environment

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### Species Account, Life History, and Habitat Status

The “Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Dixie National Forest” (Rodriguez 2008) is a comprehensive description of life histories and habitat requirements for species that occur or have habitat within the Motorized Travel Plan project area. Principle habitats described in this assessment were used to assess the sensitive plant habitat conditions in reference to this project. Potential effects and determinations are based in part upon the information presented in this document. Rodriguez (2008) is hereby incorporated by reference.

## VI. Effects of the Proposed Action

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### Direct and indirect effects common to all sensitive plant species

The PAWM is an action that proposes to designate a system of authorized roads and trails for motor vehicle use and prohibit cross country motorized travel. In order to accomplish this, decommissioning activities and road construction activities will occur. Cross country travel will be eliminated. Effects to the sensitive plant species on the Dixie National Forest of the PAWM Alternative (proposed action) will be disclosed and compared to the effects of no action in this biological evaluation. This section is being created to reduce repetition within this document. Any direct and indirect effects on individual species which would be different than those disclosed below will be included with the direct and indirect effects disclosure for each sensitive plant species.

The effects described directly below all contribute to either increase or decrease habitat effectiveness of the sensitive plant populations and their habitats found on the Dixie National Forest. These effects resulting from the PAWM are common to all sensitive plant species evaluated in this biological assessment. They include:

**1) Habitat fragmentation.** Habitat fragmentation caused by motorized roads and trails would result in less continuous blocks of potentially suitable habitat for sensitive plant populations to disperse into. Increasing habitat effectiveness for sensitive plants from fewer motorized routes and the elimination of cross country motorized travel would provide for more continuous untraveled blocks of potentially suitable sensitive plant habitat for enhanced sensitive plant dispersal and survivorship. This would increase occupied and potentially suitable habitat availability to connect discrete sensitive plant populations and create opportunities for expanding these populations across the landscape. Decreasing habitat effectiveness for sensitive plants would cause a more divided landscape with more motorized routes and allowable cross country travel increasingly contributing to interruptions in sensitive plant dispersal and to the isolation of discrete populations. This could lead to a greater vulnerability for discrete populations to be less resilient to impacts caused by other natural and human-induced influences on these sensitive plant habitats.

**2) Exposure to human disturbance.** Motorized road and trail use, maintenance activities, and cross-country travel would result in impacts from dust collecting on sensitive plant individuals within 300 feet of disturbance (personal communication with Bekee Megown – USFWS on 3-10-2009) although these effects are only minor (Padgett et al. 2007). Dust collection on plants may cause minor stomatal blockage on vegetation and surface accumulations of dust may periodically inhibit photosynthesis, respiration (Padgett et al. 2007) and water-use efficiency (Sharifi et al. 1997). Exposure to human disturbance would also result in trampling of sensitive plants underfoot and by motorized vehicles. Increasing habitat effectiveness for sensitive plants from fewer motorized routes and the elimination of cross country motorized travel would provide for less impact on sensitive plant individuals from dust because of declining motorized use. It would also result in fewer impacts to sensitive plant individuals and their habitats from decreased use causing a lower frequency of trampling underfoot and from motorized vehicles. Decreasing habitat effectiveness for sensitive plants caused by more motorized routes and allowable cross country motorized travel would result in more impact from dust and trampling because of the increased use of sensitive plant habitats.

**3) Potential for noxious and invasive weed perpetuation and/or infestation.** Sensitive plant habitat that is repeatedly disturbed by motorized travel facilitating human disturbance will have a greater potential for noxious weed infestation and the perpetuation of invasive weedy plants. Noxious weeds and weedy invasives may displace habitat for sensitive plant species through competition and dominance of localized resources. Increasing habitat effectiveness for sensitive plants would be accomplished by having fewer motorized travel routes and the elimination of cross country motorized travel. Noxious weeds and weedy invasives often follow disturbance activities in many of the plant community types on the Dixie National Forest. Decreasing disturbance activities resulting from decreased motorized travel would decrease the introduction of vectors for distribution of weeds onto these sensitive plant habitats (e.g. weed seeds carried on tires, wheels, and chassis of motorized vehicles and on feet and clothing of people) and also decrease a weeds' ability to spread more rapidly. Conversely, decreasing habitat effectiveness for sensitive plants would occur from having more motorized travel routes and allowable cross country motorized travel because it increases the potential for disturbance and subsequent infestation and perpetuation of weeds.

**4) Retention and development of soil.** The retention and development of soil within sensitive plant habitat will be affected by the level of motorized travel allowed in the project area. Human disturbance caused by motorized travel causes erosion from aeolian displacement of soil particles, or wind-blown dust, (Padgett et al. 2007) and also from water runoff of road and trail surfaces. Motorized travel disturbance can cause reduced infiltration which increases runoff. This runoff coupled with a lack of vegetation, compaction, micro- topography of road and trail surfaces, and the interruption of natural water flow in the surrounding landscape often contributes to the formation of small rills and gullies on and adjacent to road and trail surfaces. This micro-channeling facilitates water flow and soil loss. Increasing habitat effectiveness for sensitive plants would be accomplished by reducing motorized routes and the elimination of



cross country motorized travel. The retention and development of soils would be allowed to increase if areas were less disturbed by motorized travel. This would increase the survivorship and reproductive capability of all sensitive plant individuals within sensitive plant habitat. Decreasing habitat effectiveness for sensitive plants would occur from having more motorized travel routes and allowable cross country motorized travel because these types of erosion and soil loss would be increased from cross country travel and road and trail use and maintenance. Soil loss and erosion would cause more impacts to sensitive plants and their habitats.

These effects would have both short-term and long-term effects to sensitive plant occupied and potentially suitable habitats. For the purposes of this project, short-term effects are those that will occur within five years of beginning implementation. Long-term effects are considered as occurring five years or more after implementation.

Under the PAWM, decommissioning activities may occur through a variety of techniques including: natural re-vegetation, ripping, seeding, planting, placing rocks, signing, and re-contouring routes. During inactive decommissioning of routes such as natural re-vegetation of route surfaces and signing, no effects to sensitive plants or their habitats would occur from the decommissioning activity itself. There will be no ground-disturbing activity. In areas where occupied and potentially suitable sensitive plant habitat occurs on and adjacent to route surfaces to be actively decommissioned, individual sensitive plant species would experience impacts. The direct and indirect impacts for active decommissioning activities would be a loss of sensitive plant individuals and their habitats in those areas from the destruction of plant individuals and from the effects for decreasing sensitive plant habitat effectiveness described above. These effects would be short-term. Once the site has been actively decommissioned, the site would be allowed to naturally reclaim and there would be no more motorized travel disturbance. Therefore, habitat effectiveness for sensitive plants regarding habitat fragmentation, exposure to human disturbance, potential for noxious weed and invasive weedy plants, and retention and development of soil would increase over time. Therefore, long-term effects would be beneficial because disturbance from motorized travel would no longer take place.

The type and nature of decommissioning has not yet been determined under the PAWM for each route to be decommissioned. Prior to implementation, a site-specific review of known occupied and potentially suitable sensitive plant habitats will occur in determining the appropriate technique for decommissioning each route.

Under the PAWM alternative, there are five motorized routes that will be designated as open from a closed unauthorized status within occupied or potentially suitable habitat for sensitive plant species. Under the PAWM, these routes are either existing user created routes or proposed re-routes (new construction). These five motorized routes affect 0.4 % of all the sensitive plant populations within the project area. Two sensitive plant species are affected by this designation change and/or construction activities. These are Arizona willow (*Salix arizonica*) and Podunk groundsel (*Senecio malmstenii*). The direct and indirect impacts for designating user-created routes as open and re-route construction activities would be a loss of Arizona willow and Podunk groundsel individuals and their habitats in those areas from the destruction of plant individuals and from the effects for decreasing sensitive plant habitat effectiveness described above. These

effects would be adverse and both short-term and long-term. This loss of occupied and potentially suitable habitat to Arizona willow and Podunk groundsel would compromise these affected sensitive plant individuals and habitat in the short term through removal and alteration and in the long term from effects from decreasing habitat effectiveness from increased motorized use. These would include increasing habitat fragmentation, increased exposure to human disturbance, increased potential for noxious and invasive weed perpetuation and/or infestation, and a decline in the retention and development of soil. The magnitude of these effects to their respective habitats within the project area will be discussed in the individual species effects section below.

The effects from roads (Table 2) and cross country travel (Table 3) below compares the magnitude of those effects common to all sensitive plant species described above for the PAWM and no action alternatives. Overall habitat effectiveness for each sensitive plant species will either be increased, decreased, or remain stable depending on this comparison. This analysis was derived from data found within the Dixie National Forest Rare Plant Database (USDAFS 2009). All sensitive plant populations and their habitats located within the PAWM project area (with an additional 500 foot buffer and inholdings) have been included in this analysis. The Dixie National Forest Rare Plant Database is a GIS point layer with attributes that provides more detailed information about each sensitive plant location. The level of detail of information for each discrete location is variable. Point location accuracies vary ranging from meter to legal description sections. For the purposes of the analysis for this biological evaluation, all points were considered equal populations with an equal number of individuals and similar accuracies. Polygons for these plants are unavailable and counting individuals plants has not been done in most cases. Coarse population estimates of size and number are available on some and not available on most. Delineating polygons around populations and counting individual plants has proven to be impractical and this information is simply unavailable. In reality, some of these point populations may have a few individuals and others may have hundreds. This analysis buffers the open and closed route GIS layers for the PAWM and No Action Alternatives by 500 feet to account for effects to sensitive plants and their habitats such as dust and also to account for variability in size and continuity of sensitive plant populations and their occupied and potentially suitable habitats. Effects to sensitive plants and their habitats from the PAWM that are further away than 500 feet from a route will not occur. This method of approach is appropriate given the scale of the analysis and the coarse and variable nature of the sensitive plant data available. Also, it is important to note that this is localized and accurate data and is the best data that is available for the Dixie National Forest. This sensitive plant data is a compilation of all Dixie National Forest records, collection records, herbarium collections throughout the state, local Forest herbarium collections, Forest sensitive plant guides, the Utah Natural Heritage Database, the Capitol Reef National Park (CARE) database, and all survey, inventory and monitoring reports ever created on the Dixie National Forest.

**Table 2. Sensitive plant occupied and suitable habitat within 500 feet of open routes in the project area boundary + 500 feet beyond. No Action compared with the PAWM alternative (proposed action).**

<b>Species</b>	<b><u>NO ACTION</u> % of occupied &amp; suitable habitat affected</b>	<b><u>PAWM</u> % of occupied &amp; suitable habitat affected</b>	<b>(+/-) % change</b>	<b>Effect of Proposed Action (PAWM)</b>
Angell cinquefoil( <i>Potentilla angelliae</i> )	24	24	0	No Impact
Aquarius paintbrush( <i>Castilleja aquariensis</i> )	29	29	0	No Impact
Arizona willow( <i>Salix arizonica</i> )	45	48	+ 3	May impact would not cause a loss of persistence
Bicknell thelesperma ( <i>Thelesperma subnudum</i> var. <i>alpinum</i> )	0	0	0	No Impact
Cedar Breaks biscuitroot ( <i>Cymopterus minimus</i> )	37	31	- 6	May impact would not cause a loss of persistence
Pinnate spring-parsley ( <i>Cymopterus beckii</i> )	21	21	0	No Impact
Dana milkvetch ( <i>Astragalus henrimontanensis</i> )	0	0	0	No Impact
Guard milkvetch ( <i>Astragalus zionis</i> var. <i>vigulus</i> )	14	14	0	No Impact
Jones goldenaster ( <i>Heterotheca jonesii</i> )	20	20	0	No Impact
Little penstemon( <i>Penstemon parvus</i> )	65	59	- 6	May impact would not cause a loss of persistence
Maguire campion( <i>Silene petersonii</i> )	32	25	- 7	May impact would not cause a loss of persistence
Navajo Lake milkvetch( <i>Astragalus limnocharis</i> var. <i>limnocharis</i> )	60	23	- 37	May impact would not cause a loss of persistence
Neese's peppergrass ( <i>Lepidium montanum</i> var. <i>neeseae</i> )	12	12	0	No Impact
Paradox moonwort( <i>Botrychium paradoxum</i> )	100	100	0	No Impact
Pine Valley goldenweed ( <i>Haplopappus crispus</i> )	0	0	0	No Impact

**Table 2 Continued... Sensitive plant occupied and suitable habitat within 500 feet of open routes in the project area boundary + 500 feet beyond. No Action compared with the PAWM alternative (proposed action).**

<b>Species</b>	<b><u>NO ACTION</u> % of occupied &amp; suitable habitat affected</b>	<b><u>PAWM</u> % of occupied &amp; suitable habitat affected</b>	<b>(+/-) % change</b>	<b>Effect of Proposed Action (PAWM)</b>
Pinyon penstemon ( <i>Penstemon pinorum</i> )	0	0	0	No Impact
Podunk groundsel( <i>Senecio malmstenii</i> )	12	12	0 (Net Change)	May impact would not cause a loss of persistence
Rabbit Valley gilia( <i>Gilia caespitosa</i> )	0	0	0	No Impact
Red Canyon beardtongue( <i>Penstemon bracteatus</i> )	24	15	- 9	May impact would not cause a loss of persistence
Reveal paintbrush( <i>Castilleja parvula</i> var. <i>revealii</i> )	29	22	- 7	May impact would not cause a loss of persistence
Rock tansy ( <i>Sphaeromeria capitata</i> )	63	42	- 21	May impact would not cause a loss of persistence
Table Cliff milkvetch ( <i>Astragalus limnocharis</i> var. <i>tabulaeus</i> )	19	16	- 3	May impact would not cause a loss of persistence
Widtsoe buckwheat ( <i>Eriogonum aretioides</i> )	19	15	- 4	May impact would not cause a loss of persistence
Yellow-white catseye( <i>Cryptantha ochroleuca</i> )	33	25	- 8	May impact would not cause a loss of persistence
<b>Total Sensitive Plant Habitat Affected</b>	<b>30</b>	<b>25</b>	<b>- 5</b>	

**Table 3. Sensitive plant occupied and suitable habitat within the project area boundary + 500 feet beyond (including inholdings\*) affected by cross country travel status designation as specified by the No Action compared with the PAWM alternative (proposed action).**

<b>Species</b>	<b><u>NO ACTION</u></b> <b>% of occupied &amp; suitable habitat affected by cross-country travel</b>	<b><u>PAWM</u></b> <b>% of occupied &amp; suitable habitat affected by cross-country travel</b>	<b>(+/-) % change</b>	<b>Effect of Proposed Action (PAWM)</b>
Angell cinquefoil( <i>Potentilla angelliae</i> )	100	0	- 100	Beneficial Impact
Aquarius paintbrush( <i>Castilleja aquariensis</i> )	100	0	- 100	Beneficial Impact
Arizona willow( <i>Salix arizonica</i> )	100	70	- 30	Beneficial Impact
Bicknell thelesperma ( <i>Thelesperma subnudum</i> var. <i>alpinum</i> )	100	80	- 20	Beneficial Impact
Cedar Breaks biscuitroot ( <i>Cymopterus minimus</i> )	75	6	- 69	Beneficial Impact
Pinnate spring-parsley ( <i>Cymopterus beckii</i> )	100	42	- 58	Beneficial Impact
Dana milkvetch ( <i>Astragalus henrimontanensis</i> )	80	0	- 80	Beneficial Impact
Guard milkvetch ( <i>Astragalus zionis</i> var. <i>vigulus</i> )	43	0	- 43	Beneficial Impact
Jones goldenaster ( <i>Heterotheca jonesii</i> )	40	0	- 40	Beneficial Impact
Little penstemon( <i>Penstemon parvus</i> )	100	0	- 100	Beneficial Impact
Maguire campion( <i>Silene petersonii</i> )	62	5	- 57	Beneficial Impact
Navajo Lake milkvetch( <i>Astragalus limnocharis</i> var. <i>limnocharis</i> )	92	8	- 84	Beneficial Impact
Neese's peppergrass ( <i>Lepidium montanum</i> var. <i>neeseae</i> )	24	0	- 24	Beneficial Impact
Paradox moonwort( <i>Botrychium paradoxum</i> )	100	0	- 100	Beneficial Impact
Pine Valley goldenweed ( <i>Haplopappus crispus</i> )	0	0	0	No Impact

**Table 3 Continued... Sensitive plant occupied and suitable habitat within the project area boundary + 500 feet beyond (including inholdings\*) affected by cross country travel status designation as specified by the No Action compared with the PAWM alternative (proposed action).**

Species	<u>NO ACTION</u> % of occupied & suitable habitat affected by cross-country travel	<u>PAWM</u> % of occupied & suitable habitat affected by cross-country travel	(+/-) % change	Effect of Proposed Action (PAWM)
Pinyon penstemon ( <i>Penstemon pinorum</i> )	100	38	- 62	Beneficial Impact
Podunk groundsel( <i>Senecio malmstenii</i> )	64	0	- 64	Beneficial Impact
Rabbit Valley gilia( <i>Gilia caespitosa</i> )	100	30	- 70	Beneficial Impact
Red Canyon beardtongue( <i>Penstemon bracteatus</i> )	45	3	- 42	Beneficial Impact
Reveal paintbrush( <i>Castilleja parvula</i> var. <i>revelii</i> )	76	3	- 73	Beneficial Impact
Rock tansy ( <i>Sphaeromeria capitata</i> )	100	25	- 75	Beneficial Impact
Table Cliff milkvetch ( <i>Astragalus limnocharis</i> var. <i>tabulaeus</i> )	81	0	- 81	Beneficial Impact
Widtsoe buckwheat ( <i>Eriogonum aretioides</i> )	53	13	- 50	Beneficial Impact
Yellow-white catseye( <i>Cryptantha ochroleuca</i> )	63	7	- 56	Beneficial Impact
Total Sensitive Plant Habitat Affected	77	12	- 65	

\* Inholdings are lands within the Dixie National Forest boundary that are owned or managed by other entities. Inholdings are included within this cross-country travel analysis because sensitive plant populations within inholdings are often an extension of occupied and potentially suitable habitats found within the project area. Effects to sensitive plant populations within inholdings would be the same as those found within the project area and may contribute to an increase or decrease in habitat effectiveness for the sensitive plants within the larger population.

Fragmented habitat from a loss of sensitive plant habitat continuity across inholdings within the project area would contribute to a decrease in habitat effectiveness for the sensitive plants and its' habitats found within the project area. The Dixie National Forest has no administrative control over inholdings and cross country travel would be permitted unless unauthorized by a controlling agency such as the National Park Service, Bureau of Land Management, or State of

Utah. Values within the third column in Table 3 above would all be zero under the PAWM if sensitive plants and their habitats within inholdings were not analyzed.

### **Cumulative Effects Area (CEA)**

The cumulative effects areas (CEA) delineated for sensitive plant species were chosen for each plant species on the basis of geologic substrate, habitat requirements, and the reasonable known and suspected distribution for these sensitive plants in and adjacent to the project area. These areas may include lands meeting these requirements on the Dixie National Forest including private lands, state, BLM, and Park Service lands which may be located within or adjacent to the boundaries of the Dixie National Forest. Cumulative effects areas have been assigned to groups of sensitive plant species if their suitable habitat is dependent upon similar geologic substrates and/or habitat requirements.

Cumulative effects area 1 delineates the cumulative effects area for Angell cinquefoil, Aquarius paintbrush, little penstemon, and paradox moonwort. This cumulative effects area includes all open meadowlands on the Aquarius plateau and Boulder Top from 8,000 to 11,300 feet on the Escalante and Teasdale Ranger Districts. Habitat requirements for these four sensitive plant species include open silver sagebrush or grass/forb dominated meadows, moist and wet meadows, and sub-alpine meadows. This cumulative effects area was chosen on the basis of similar habitats, volcanic soils, and their reasonable known and suspected distributions in and adjacent to the project area.

Cumulative effects area 2 delineates the cumulative effects area for Pine Valley goldenweed. This cumulative effects area includes the Pine Valley Mountain Wilderness extending out to its boundary. This Wilderness Area occurs on the Pine Valley Ranger District. This cumulative effect area was chosen because the habitats found within this Wilderness Area specifically meet the requirements for this sensitive plant species. Also the known and suspected distribution of this sensitive plant does not go beyond the Pine Valley Mountain Wilderness Boundary due to elevation limitations.

Cumulative effects area 3 delineates the cumulative effects area for Bicknell Thelesperma, pinnate spring-parsley, and Rabbit Valley Gilia. This cumulative effects area includes all Navajo, Cutler and Wingate Sandstones and the Carmel Formation on the north and east end of the Teasdale Ranger District and extending to the west to Bicknell and northward to east slope of Thousand Lake Mountain at the Wayne/Sevier County Line and east to the waterpocket fold where geology shifts to older geologic formations. This cumulative effects area was chosen on the basis of similar habitat-dependent geologic formations (Navajo, Cutler, Wingate, and Carmel Formations) and their reasonable known and suspected distributions in and adjacent to the project area.

Cumulative effects area 4 delineates the cumulative effects area for Cedar Breaks biscuitroot, Maguire campion, Navajo Lake milkvetch, Podunk groundsel, Red Canyon beardtongue, Reveal paintbrush, rock tansy, Table Cliff milkvetch, Widtsoe buckwheat, and yellow-white catseye. This cumulative effects area includes all Wasatch Limestone Formation soils on the Markagunt Plateau, Paunsaugunt Plateau, Table Cliff Plateau, Canaan Mountain, Horse Creek Top, Griffin Top, and Barney Top. This cumulative effects area was chosen on the basis of similar habitat-

dependent Wasatch Limestone Formation derived soils and their reasonable known and suspected distributions in and adjacent to the project area.

Cumulative effects area 5 delineates the cumulative effects area for Dana milkvetch and Jones goldenaster. This cumulative effects area includes all Navajo sandstone and associated sandy/volcanic soils on the south slope of the Griffin Top and Boulder Mountain. This area extends on the west from the North Creek road eastward to Long Neck just east of the town of Boulder and southward to the town of Escalante. This cumulative effects area was chosen on the basis of similar habitat-dependent Navajo sandstone and associated sandy/volcanic soils and their reasonable known and suspected distributions in and adjacent to the project area.

Cumulative effects area 6 delineates the cumulative effects area for Arizona willow. This cumulative effects area includes all riparian (including lotic and lentic wet meadows) streams, seeps, and springs above 8,500 feet on the Cedar City, Powell, Escalante, and Teasdale Ranger Districts. This includes all inholdings owned or administered by other entities. This cumulative effects area was chosen on the basis of habitat requirements for this sensitive plant species and its' reasonable distribution within and adjacent to the project area.

Cumulative effects area 7 delineates the cumulative effects area for Guard milkvetch. This cumulative effects area includes all chaparral, mountain brush, and pinyon-juniper plant communities below 8,500 feet on the east slope of the Pine Valley Mountains from New Harmony southward to Leeds and eastward to the I-15 corridor. This cumulative effects area was chosen on the basis of habitat requirements associated with chaparral and associated mixed plant communities unique to the area and its' reasonable distribution within and adjacent to the project area.

Cumulative effects area 8 delineates the cumulative effects area for Neese's peppergrass. This cumulative effects area includes all of the Tertiary Claron Limestone Formation and Navajo sandstone on Table Cliff Plateau, Horse Creek Top, Griffin Top and extends eastward across the south slope of Griffin Top through the Box-Death Hollow Wilderness to Sand Creek on the Escalante Ranger District. This cumulative effects area was chosen on the basis of habitat-dependent Tertiary Claron Limestone Formation and Navajo Sandstone derived soils and its' reasonable known and suspected distribution in and adjacent to the project area.

Cumulative Effects area 9 delineates the cumulative effects area for pinyon penstemon. This cumulative effects area includes the northern slope of the Pine Valley Mountains and the southern slope of the Antelope mountain range. This cumulative effects area was chosen on the basis of pinyon-juniper habitat requirements and its' reasonable known and suspected distribution in and adjacent to the project area.

### **Past, Present, and Reasonably Foreseeable Future Actions influencing Landscape Characteristics**

Due to the large cumulative effects areas of this proposed action and the diversity of activities that occur within the area, this section will address activities and possible cumulative effects associated with the proposed action. These cumulative effects are common to several or all of the species and their habitats considered in this biological evaluation. These include past,



present, and reasonably foreseeable future actions in the cumulative effects area. These actions include utilities, oil and gas (mineral developments), transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing.

#### Cumulative effects common to all sensitive plant species that have direct and indirect effects

This section is being created to reduce repetition within this document. Any cumulative effects on individual species which would be different than those disclosed below will be included with the cumulative effects disclosure for each sensitive plant species.

#### **Utilities**

Utilities include power lines, water lines/tanks, fiber optic and other telecom lines, and communication sites. These activities result in disturbances in vegetation and soil and long-term commitments for access to these improvements. Effects from utility disturbances on vegetation and soils include: 1) loss of effective ground cover, 2) loss of soil development and nutrient cycling, 3) change in plant community composition and structure, 4) introduction and/or perpetuation of invasive and weedy plants, 5) decrease in perennial production and increase in annual production, 6) reproductive capability and recruitment of perennial plants, 7) reduction of shrub/tree cover, 8) changes to existing soil properties (changed relationship between infiltration and runoff, degradation, compaction, capping, soil loss) causing rills, gullies, blowouts, and wind-scoured areas. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable utility projects and their associated activities combined with the proposed action (PAWM) would have no cumulative impact on sensitive plants and their habitats. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. Motorized access would still be allowed for long-term maintenance of these utilities, however access roads to these maintenance corridors would be limited and cross country travel would be eliminated under the PAWM. Since motorized maintenance access would be allowed within the utility project corridors, no additional sensitive plants or their habitats would be affected cumulatively by effects of utility corridors in combination with the PAWM. As a result, there would be no change in habitat effectiveness for sensitive plants evaluated within this biological evaluation.

#### **Oil and Gas and other Mineral Developments**

This includes oil and gas project development, exploration, and all associated activities. It also includes other minerals development and mineral materials (e.g. gravel, perlite, cinders). Mining and oil/gas exploration currently occurs in isolated areas on the Dixie National Forest. These activities will continue to occur with a possible increase in oil and gas activity in the near future. These activities could result in the loss of sensitive plants and their habitats at individual mines and exploration sites as well as the road systems used to access those sites. These activities could also disturb or displace sensitive plant species near their operations. Mining and oil/gas

exploration and its associated activities often create highly disturbed soils, erosion, and compaction from digging, heavy equipment operation, creation of tailings, and road building. Oil and gas activities from seismic exploration can also lead to increased human and motorized disturbance in the cumulative effects area. These disturbed sites may result in the introduction and spread of noxious weeds. These activities also include effects to vegetation and soils such as disturbed soil structure, erosion, compaction, increased runoff potential, watershed diversion and disruption, creation of open disturbed sites, and destruction of native vegetation. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable oil, gas, and mineral projects and their associated activities combined with the proposed action (PAWM) would have no cumulative impact on sensitive plants and their habitats. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. However, access for seismic exploration and road building would still be controlled and mitigated under site-specific analysis and environmental documentation for these oil, gas, and mineral development projects. Therefore, no additional sensitive plants or their habitats would be affected cumulatively by effects of oil/gas/mineral projects in combination with the PAWM. As a result, there would be no change in habitat effectiveness for sensitive plants evaluated within this biological evaluation.

## **Transportation**

This section includes past, present and reasonably foreseeable future motorized route designation, construction, and decommissioning (transportation projects) not being addressed by this proposed action. Effects to sensitive plants and their habitats from these transportation projects would be the same as already described in the “Direct and indirect effects common to all sensitive plant species on the Dixie National Forest” section above. Given that these effects are the same as the effects under this proposed action (PAWM), a contribution to these effects would decrease or increase habitat effectiveness for sensitive plants and their habitats depending on the nature of the transportation project and whether or not sensitive plant habitat was directly or indirectly affected by the project.

Cumulative effects as a result of past, present, and reasonably foreseeable transportation projects and their associated activities combined with the proposed action (PAWM) would have cumulative effects on sensitive plants and their habitats. These cumulative effects may be short-term and long-term. These cumulative effects may be beneficial if an overall reduction in motorized access is the result through sensitive plant habitat. This would cause an increase in habitat effectiveness for the affected sensitive plant habitat. These cumulative effects may be adverse if there is an increase of motorized access through sensitive plant habitat.

## **Recreation**

Activities such as hiking, ATV and ORV use, horseback riding, mountain biking, camping (including dispersed), hunting, fishing, and sight-seeing are some of the typical activities which occur in the cumulative effects area. Developed recreation maintenance is also included.

Recreational development can result in the loss of some sensitive plant habitats either due to direct loss or due to the disturbance and/or displacement that may result following completion.

Recreational activities can create habitat for and result in the spread of noxious weeds. With the increasing recreational use of Dixie National Forest administered lands, there is a greater potential for weeds to be transported into the cumulative effects area. Noxious weeds from areas outside of the cumulative effects area can be transported into the area on recreational vehicles, recreational animals, shoes, clothing, people, recreational equipment, tires, recreational road maintenance equipment, etc. Activities such as recreational vehicle use, hunting camps, campgrounds, trails, and around popular fishing lakes and streams can contribute to adverse impacts to sensitive plants and their habitats where these uses occur in sensitive plant habitat. These recreational activities affect vegetation and soils by disturbing soil structure, increasing erosion, causing compaction, increasing runoff potential, watershed diversion and disruption, creation of open disturbed sites, and destruction of native vegetation. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable recreation activities combined with the proposed action (PAWM) would have short-term and long-term beneficial impacts on sensitive plants and their habitats. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. This reduction of motorized access and elimination of cross country travel would cause an overall decline in the sensitive plant habitat being affected by recreation in the cumulative effects area. These sensitive plant habitat areas would not be as accessible to motor vehicles for recreation under the PAWM and habitat effectiveness would increase for sensitive plants evaluated within this biological evaluation.

## **Vegetation Treatments**

Vegetation treatments include timber harvest, thinning, chaining maintenance, fuel reduction activities, prescribed fire, fuelwood collection, and Christmas tree collection. These vegetation treatment activities can alter vegetation diversity that can result in effects on sensitive plant species. These activities can also result in the loss of sensitive plant habitat from associated activities including road building, tree removal, and/or dramatic changes in vegetation structure and composition.

Vegetation treatments cause effects from prescribed fire, mechanical treatments, general vegetation alteration, road building, skid trails, log decks, and other related activities. These effects include disturbed soil structure, erosion, compaction, increased runoff potential,

watershed diversion and disruption, creation of open disturbed sites, destruction of native vegetation, change in downed fuel loads, and the introduction of weeds (by heavy equipment, tree planting, thinning, snag creation, and opening the canopy). Furthermore, weeds compete with native vegetation seedlings and harbor insects and diseases that may hinder re-vegetation efforts. Displaced vegetation through vegetation treatments can alter natural succession, natural disturbance regimes, and vegetation structure, density, and composition. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable vegetation treatments and their associated activities combined with the proposed action (PAWM) would have short-term and long-term beneficial impacts on sensitive plants and their habitats. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. This reduction of motorized access and elimination of cross country travel would cause an overall decline in the sensitive plant habitat being affected by vegetation treatments in the cumulative effects area. These sensitive plant habitats areas would not be as accessible for vegetation treatments under the PAWM and habitat effectiveness would increase for sensitive plants evaluated within this biological evaluation.

### **Land Exchanges and Easements**

Land exchanges and easements include property disposal, highway easements, water diversions, and water augmentation. Property disposal of sensitive plant habitats would cause a loss of both plants and habitat. However, effects to sensitive plants resulting from a land exchange would be disclosed in site-specific analysis and environmental documentation before implementation of land exchange projects. Effects from highway easements, water diversions, and water augmentation may lead to dewatering and/or inundation of sensitive plant habitats and effects from allowable motorized access for maintenance purposes. Effects from easements are the same as those to utility corridors. These disturbances in vegetation and soils include: 1) loss of effective ground cover, 2) loss of soil development and nutrient cycling, 3) change in plant community composition and structure, 4) introduction and/or perpetuation of invasive and weedy plants, 5) decrease in perennial production and increase in annual production, 6) reproductive capability and recruitment of perennial plants, 7) reduction of shrub/tree cover, 8) changes to existing soil properties (changed relationship between infiltration and runoff, degradation, compaction, capping, soil loss) causing rills, gullies, blowouts, and wind-scoured areas. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable land exchanges and easements and their associated activities combined with the proposed action (PAWM) would

have no cumulative impact on sensitive plants and their habitats. Land exchanges in combination with the PAWM would have no cumulative impact on sensitive plants or their habitats because the PAWM has no authority to effect lands not administered by Dixie National Forest. Access into these land exchange areas would have to be delineated and effects to sensitive plant habitats disclosed during site-specific analysis and environmental documentation for each individual land exchange project. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. Motorized access would still be allowed for the long-term maintenance of easements, however access roads for maintenance of easements would be limited and cross country travel would be eliminated under the PAWM. Since motorized maintenance access would be allowed within the easements, no additional sensitive plants or their habitats would be affected cumulatively by effects of easements in combination with the PAWM. As a result, there would be no change in habitat effectiveness for sensitive plants evaluated within this biological evaluation.

### **Special Use Permits**

Special uses are defined as one-time events (e.g. horse races, trekking, outfitter guides, resorts, campground concessions, irrigation water ditches, stock ponds, boat docks, heliports, corrals, fences, etc.). These activities have localized short-term effects on those areas where they are permitted. These recreational activities affect vegetation and soils by disturbing soil structure, increasing erosion, causing compaction, increasing runoff potential, watershed diversion and disruption, creation of open disturbed sites, and destruction of native vegetation. If these activities occur in sensitive plant habitats, direct trampling of sensitive plants could occur. These activities could also contribute to the spread and proliferation of noxious weeds on special use related equipment, recreational animals, and pack animals used by outfitter guides. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable special use activities combined with the proposed action (PAWM) would have short-term beneficial impacts on sensitive plants and their habitats. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. This reduction of motorized access and elimination of cross country travel would cause an overall decline in the sensitive plant habitat being affected by special uses in the cumulative effects area. These sensitive plant habitats areas would not be as accessible to motor vehicles for special uses under the PAWM and habitat effectiveness would increase in the short-term for sensitive plants evaluated within this biological evaluation.

### **Grazing**

Livestock grazing and associated rangeland developments (stock ponds, troughs, springs, salt blocks, staging areas, corrals, and fences) occur throughout the Dixie National Forest. Livestock grazing has altered the vegetative composition and diversity across many landscapes on the

Dixie National Forest. This has changed vegetation patterns that have resulted in effects on sensitive plant species and their habitats. Livestock can also trample sensitive plants or disturb habitat while they use allotments. Livestock operations and their associated activities can result in the spread of noxious weeds. Disturbance from livestock can create a seedbed for noxious weeds to colonize. Livestock may also transport noxious weed seeds from adjacent land ownerships onto the Dixie National Forest, which may establish new weed infestations within sensitive plant habitats. Herding, riding fence, watering, and maintaining range improvements are operational livestock activities performed by permittees. Permittees often utilize Forest roads and trails and cross country motorized travel for performing these duties. These activities can have adverse effects by increasing disturbance to vegetation and soils which affect sensitive plant habitat where it occurs. These effects can pose problems because they contribute to habitat fragmentation, exposure to human disturbance, potential for noxious and invasive weed perpetuation and/or infestation, and the retention and development of soil for sensitive plants as described in the direct and indirect effects section above. A contribution to these effects would decrease habitat effectiveness for sensitive plants and their habitats.

Cumulative effects as a result of past, present, and reasonably foreseeable livestock grazing and its' associated activities combined with the proposed action (PAWM) would have short-term and long-term beneficial impacts on sensitive plants and their habitats. The proposed action would reduce the overall motorized access in sensitive plant habitat within the cumulative effects area. This reduction of motorized access and elimination of cross country travel would cause an overall decline in the sensitive plant habitat being affected by permittees using motorized vehicles to access range and range developments within the cumulative effects area. These sensitive plant habitat areas would not be as accessible to permittees using motorized vehicles under the PAWM and habitat effectiveness would increase for sensitive plants evaluated within this biological evaluation.

#### Effects to Individual Sensitive Plant Species

##### **Angell cinquefoil (*Potentilla angelliae*)**

##### **Direct and Indirect Effects**

Angell cinquefoil is endemic to sub-alpine rocky meadows of Boulder Top on the Teasdale portion of the Fremont River Ranger District (Teasdale Ranger District). From Table 2 above, we see that 24 percent of occupied and potentially suitable habitat for Angell cinquefoil is currently within 500 feet of open routes in the project area. This is considered Angell cinquefoil occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of Angell cinquefoil occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Angell cinquefoil as a result of implementing this proposed action.

From Table 3 above, cross country travel in Angell cinquefoil occupied and potentially suitable habitat will be reduced from 100 percent to zero under PAWM. Cross country travel will be



entirely eliminated from Angell cinquefoil occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 2.7 percent of the total sensitive plant habitat for all species within the project area). Boulder Top is a largely open sub-alpine meadow top that lends itself to continuous cross country travel. Therefore, elimination of cross country travel would contribute substantially to increase habitat effectiveness for Angell cinquefoil within the project area. Increased habitat effectiveness for Angell cinquefoil would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Angell cinquefoil would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Angell cinquefoil plants or their habitat.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Angell cinquefoil include oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Angell cinquefoil in combination with the proposed action (PAWM). Activities from oil and gas and other mineral developments and land exchanges and easements would have no impact on Angell cinquefoil in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on Angell cinquefoil in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Angell cinquefoil and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Angell cinquefoil plants or their habitat.

### **Aquarius paintbrush (*Castilleja aquariensis*)**

#### Direct and Indirect Effects

Aquarius paintbrush is endemic to high elevation open silver sagebrush and grass (primarily sheep fescue) dominated meadows of the Aquarius Plateau and Boulder Top on the Escalante and Teasdale Ranger Districts. From Table 2 above, we see that 29 percent of occupied and potentially suitable habitat for Aquarius paintbrush is currently within 500 feet of open routes in the project area. This is considered Aquarius paintbrush occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of Aquarius paintbrush occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use,

decommissioning, or construction activities will occur to Aquarius paintbrush as a result of implementing this proposed action.

From Table 3 above, cross country travel in Aquarius paintbrush occupied and potentially suitable habitat will be reduced from 100 percent to zero under PAWM. Cross country travel will be entirely eliminated from Aquarius paintbrush occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 20.4 percent of the total sensitive plant habitat for all species within the project area). The Aquarius Plateau and Boulder Top are high elevation open meadows with low-growing silver sagebrush, grasses, and forbs, interspersed with patches of Engelmann spruce, sub-alpine fir, and aspen. This open country lends itself to near continuous cross country travel. Therefore, elimination of cross country travel would contribute substantially to increase habitat effectiveness for Aquarius paintbrush within the project area. Increased habitat effectiveness for Aquarius paintbrush would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Aquarius paintbrush would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Aquarius paintbrush plants or their habitat.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Aquarius paintbrush include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Aquarius paintbrush in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Aquarius paintbrush in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on Aquarius paintbrush in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Aquarius paintbrush and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Aquarius paintbrush plants or their habitat.

#### **Arizona willow (*Salix arizonica*)**

##### Direct and Indirect Effects

Arizona willow is found in upper elevation (>8,500 feet) riparian corridors and wet meadows on the Cedar City, Powell, and Teasdale Ranger Districts. From Table 2 above, we see that 45 percent of occupied and potentially suitable habitat for Arizona willow is currently within 500



feet of open routes in the project area. This is considered Arizona willow occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of Arizona willow occupied and potentially suitable habitat within 500 feet of open routes in the project area increases to 48 percent. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, and construction activities will occur to Arizona willow as a result of implementing this proposed action.

There are four motorized routes that will be designated as open from a closed unauthorized status within occupied or potentially suitable habitat for Arizona willow. Under the PAWM, these routes are either existing user created routes or proposed re-routes (new construction). These four routes will affect 9 percent of the occupied and potentially suitable habitat for Arizona willow. This percentage is already reflected and included in the 3 percent increase above (this means that the PAWM reduced the open routes in Arizona willow habitat from 45 percent to 39 percent and then designated four existing user created routes or proposed re-routes to open increasing it 9 percent – from 39 to 48 percent). The direct and indirect impacts for designating user-created routes as open and re-route construction activities would be a loss of Arizona willow individuals and their habitats in those areas from the destruction of plant individuals and from the effects for decreasing sensitive plant habitat effectiveness described in the Direct and indirect effects common to all sensitive plant species section above. These effects would be adverse and both short-term and long-term. This loss of occupied and potentially suitable habitat to Arizona willow would compromise these affected sensitive plant individuals and habitat in the short-term through removal and alteration and in the long-term from effects from decreasing habitat effectiveness from increased motorized use. These would include increasing habitat fragmentation, increased exposure to human disturbance, increased potential for noxious and invasive weed perpetuation and/or infestation, and a decline in the retention and development of soil.

From Table 3 above, cross country travel in Arizona willow occupied and potentially suitable habitat will be reduced from 100 percent to 70 percent under PAWM. This 70 percent habitat is from Arizona willow populations located within inholdings. A large percentage of these inholding populations are on Cedar Breaks National Monument where cross country travel is prohibited and route use is restricted. Cross country travel will be eliminated from 30 percent of Arizona willow occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 8.3 percent of the total sensitive plant habitat for all species within the project area). Arizona willow grows in riparian corridors and wet meadows that lend themselves to cross country travel up riparian drainages and overland on wet meadows. Therefore, a reduction of cross country travel would contribute substantially to increase habitat effectiveness for Arizona willow within the project area. Increased habitat effectiveness for Arizona willow would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail).

Both decreased habitat effectiveness from unauthorized route designation, construction, and decommissioning activities and increased habitat effectiveness for Arizona willow from a reduction in cross country travel would result in both short and long-term adverse and beneficial effects to this sensitive plant species. A 3 percent increase of Arizona willow habitat in areas of open routes is small. Decommissioning activities from the PAWM will have short-term adverse effects to Arizona willow individuals and habitat and long-term beneficial effects (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Re-route construction and/or closed unauthorized designation to open on four motorized routes from the PAWM would have both short-term and long-term adverse effects to Arizona willow. The elimination of cross country travel on 30 percent of Arizona willow habitat would have beneficial effects. Therefore, this proposed action (PAWM) may impact individual Arizona willow plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Arizona willow include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Arizona willow in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Arizona willow in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Arizona willow in combination with the proposed action (PAWM) because motorized use is increased within Arizona willow habitat on open routes and decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Arizona willow and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Arizona willow plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### **Bicknell Thelesperma (*Thelesperma subnudum* var. *alpinum*)**

##### Direct and Indirect Effects

Bicknell Thelesperma is endemic to Wayne County on Navajo Sandstone and Carmel Limestone outcrops and occurs on the north end of the Teasdale Ranger District within the project area. From Table 2 above, we see that there is no occupied and potentially suitable habitat for Bicknell Thelesperma that is currently within 500 feet of open routes in the project area. This is considered Bicknell Thelesperma occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action

(PAWM), there will still be no occupied and potentially suitable habitat within 500 feet of open routes in the project area. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Bicknell Thelesperma as a result of implementing this proposed action.

From Table 3 above, cross country travel in Bicknell Thelesperma occupied and potentially suitable habitat will be reduced from 100 percent to 80 percent under PAWM. Cross country travel will be reduced by 20 percent from Bicknell Thelesperma occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.1 percent of the total sensitive plant habitat for all species within the project area). Bicknell Thelesperma occurs in rocky and sandy places and on outcrops on the vari-colored phase of Navajo Sandstone and Carmel Formation. This habitat is in broken pinyon-juniper terrain where cross-country motorized travel would be difficult in the best of conditions. Therefore, a reduction of cross country travel would only make a minor contribution to increase habitat effectiveness for Bicknell Thelesperma within the project area. Increased habitat effectiveness for Bicknell Thelesperma would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Bicknell Thelesperma would result in both short and long-term minor beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Bicknell Thelesperma plants or their habitat.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Bicknell Thelesperma include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Bicknell Thelesperma in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Bicknell Thelesperma in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term minor beneficial impacts on Bicknell Thelesperma in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Bicknell Thelesperma and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Bicknell Thelesperma plants or their habitat.

## **Cedar Breaks biscuitroot (*Cymopterus minimus*)**

### **Direct and Indirect Effects**

Cedar Breaks biscuitroot occurs in open ponderosa pine/mixed conifer, sparsely vegetated cushion plant communities, and open escarpments of the Wasatch Limestone Formation on the Cedar City, Powell, and Escalante Ranger Districts within the project area. From Table 2 above, we see that there is 37 percent occupied and potentially suitable habitat for Cedar Breaks biscuitroot that is currently within 500 feet of open routes in the project area. This is considered Cedar Breaks biscuitroot occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 31 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 6 percent reduction in Cedar Breaks biscuitroot occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Cedar Breaks biscuitroot individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Cedar Breaks biscuitroot as a result of implementing this proposed action.

From Table 3 above, cross country travel in Cedar Breaks biscuitroot occupied and potentially suitable habitat will be reduced from 75 percent to 6 percent under PAWM. Cross country travel will be reduced by 69 percent from Cedar Breaks biscuitroot occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 12.7 percent of the total sensitive plant habitat for all species within the project area). Cedar Breaks biscuitroot occurs in open ponderosa pine/mixed conifer, on escarpments, and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for Cedar Breaks biscuitroot within the project area. Increased habitat effectiveness for Cedar Breaks biscuitroot would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Cedar Breaks biscuitroot would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 6 percent of Cedar Breaks biscuitroot habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Cedar Breaks biscuitroot plants or their

habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Cedar Breaks biscuitroot include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Cedar Breaks biscuitroot in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Cedar Breaks biscuitroot in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Cedar Breaks biscuitroot in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Cedar Breaks biscuitroot and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Cedar Breaks biscuitroot plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Pinnate spring-parsley (*Cymopterus beckii*)**

#### Direct and Indirect Effects

Pinnate spring-parsley is found on cliff crevices and in sandy narrow canyon bottoms on the north end of the Teasdale Ranger District within the project area. From Table 2 above, we see that 21 percent of occupied and potentially suitable habitat for pinnate spring-parsley is currently within 500 feet of open routes in the project area. This is considered pinnate spring-parsley occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of pinnate spring-parsley occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to pinnate spring-parsley as a result of implementing this proposed action.

From Table 3 above, cross country travel in pinnate spring-parsley occupied and potentially suitable habitat will be reduced from 100 percent to 42 percent under PAWM. Cross country travel will be reduced by 58 percent from pinnate spring-parsley occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.7 percent of the total sensitive plant habitat for all species within the project area). Pinnate spring-parsley occurs in

cliff crevices and sandy narrow canyon bottoms. This habitat is in broken pinyon-juniper, mountain brush, and ponderosa pine terrain where cross-country motorized travel is already somewhat limited. However, in sandy canyon bottoms where cross country travel is more prevalent, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for pinnate spring parsley within the project area. Increased habitat effectiveness for pinnate spring parsley would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for pinnate spring parsley would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to pinnate spring-parsley plants or their habitat.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect pinnate spring parsley include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on pinnate spring-parsley in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on pinnate spring-parsley in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on pinnate spring-parsley in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to pinnate spring-parsley and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to pinnate spring-parsley plants or their habitat.

### **Dana milkvetch (*Astragalus henrimontanensis*)**

#### Direct and Indirect Effects

Dana milkvetch is endemic to Garfield County on sandy and gravelly soils in ponderosa pine, pinyon-juniper, and sagebrush communities. It occurs around Hells Backbone and Short Neck on the Escalante Ranger District within the project area. From Table 2 above, we see that there is no occupied and potentially suitable habitat for Dana milkvetch that is currently within 500 feet of open routes in the project area. This is considered Dana milkvetch occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will still be no occupied and potentially suitable habitat within 500 feet of open routes in the project area. Therefore, no

direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Dana milkvetch as a result of implementing this proposed action.

From Table 3 above, cross country travel in Dana milkvetch occupied and potentially suitable habitat will be reduced from 80 percent to zero under PAWM. Cross country travel will be completely eliminated from Dana milkvetch occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 0.4 percent of the total sensitive plant habitat for all species within the project area). Dana milkvetch occurs in open ponderosa pine, pinyon-juniper, and sagebrush communities on mixed sandy-gravelly soils. In many areas, this habitat is readily accessible to cross country motor vehicle use. Therefore, elimination of cross country travel would make a substantial contribution to increase habitat effectiveness for Dana milkvetch within the project area. Increased habitat effectiveness for Dana milkvetch would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Dana milkvetch would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Dana milkvetch plants or their habitat.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Dana milkvetch include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Dana milkvetch in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Dana milkvetch in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on Dana milkvetch in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Dana milkvetch and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Dana milkvetch plants or their habitat.

#### **Guard milkvetch (*Astragalus vigulus* var. *zioinis*)**

##### Direct and Indirect Effects

Guard milkvetch is endemic to the east side of the Pine Valley Mountains in pinyon-juniper, chaparral, and mountain brush plant communities on the Pine Valley Ranger District within the project area. From Table 2 above, we see that 14 percent of occupied and potentially suitable

habitat for guard milkvetch is currently within 500 feet of open routes in the project area. This is considered guard milkvetch occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of guard milkvetch occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to guard milkvetch as a result of implementing this proposed action.

From Table 3 above, cross country travel in guard milkvetch occupied and potentially suitable habitat will be reduced from 43 percent to zero under PAWM. Cross country travel will be completely eliminated from guard milkvetch occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 0.5 percent of the total sensitive plant habitat for all species within the project area). Guard milkvetch occurs in dense mountain brush, pinyon-juniper, mountain mahogany, and chaparral communities that are mostly inaccessible to cross country motorized travel. Therefore, the elimination of cross country travel in guard milkvetch habitat would make only a minor contribution to increase habitat effectiveness for guard milkvetch within the project area. Increased habitat effectiveness for guard milkvetch would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for guard milkvetch would result in both short and long-term minor beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to guard milkvetch plants or their habitat.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect guard milkvetch include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on guard milkvetch in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on guard milkvetch in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on guard milkvetch in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to guard milkvetch and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to guard milkvetch plants or their habitat.



## **Jones goldenaster (*Heterotheca jonesii*)**

### **Direct and Indirect Effects**

Jones goldenaster is found on sand derived from sandstone in open ponderosa pine, manzanita, pinyon pine, and Douglas-fir plant communities. It occurs around Hells Backbone on the Escalante Ranger District within the project area. From Table 2 above, we see that 20 percent of occupied and potentially suitable habitat for Jones goldenaster is currently within 500 feet of open routes in the project area. This is considered Jones goldenaster occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of Jones goldenaster occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Jones goldenaster as a result of implementing this proposed action.

From Table 3 above, cross country travel in Jones goldenaster occupied and potentially suitable habitat will be reduced from 40 percent to zero under PAWM. Cross country travel will be completely eliminated from Jones goldenaster occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.1 percent of the total sensitive plant habitat for all species within the project area). Jones goldenaster occurs in sandy open ponderosa pine, manzanita, pinyon pine, and Douglas-fir communities. In many areas, this habitat is readily accessible to cross country motor vehicle use. Therefore, elimination of cross country travel would make a substantial contribution to increase habitat effectiveness for Jones goldenaster within the project area. Increased habitat effectiveness for Jones goldenaster would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Jones goldenaster would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Jones goldenaster plants or their habitat.

### **Cumulative Effects**

Past, present, and reasonably foreseeable activities listed above that may affect Jones goldenaster include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Jones goldenaster in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Jones goldenaster in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on Jones goldenaster in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country

travel under this proposed action. General cumulative effects to Jones goldenaster and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Jones goldenaster plants or their habitat.

### **Little Penstemon (*Penstemon parvus*)**

#### **Direct and Indirect Effects**

Little penstemon occurs in high elevation open silver sagebrush and grass (primarily sheep fescue) dominated meadows of the Aquarius Plateau on the Escalante and Teasdale Ranger Districts. From Table 2 above, we see that there is 65 percent occupied and potentially suitable habitat for little penstemon that is currently within 500 feet of open routes in the project area. This is considered little penstemon occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 59 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 6 percent reduction in little penstemon occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of little penstemon individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to little penstemon as a result of implementing this proposed action.

From Table 3 above, cross country travel in little penstemon occupied and potentially suitable habitat will be reduced from 100 percent to zero under PAWM. Cross country travel will be entirely eliminated from little penstemon occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.2 percent of the total sensitive plant habitat for all species within the project area). The Aquarius Plateau is primarily high elevation open meadows with low-growing silver sagebrush, grasses, and forbs, interspersed with patches of Engelmann spruce, sub-alpine fir, and aspen. This open country lends itself to near continuous cross country travel. Therefore, elimination of cross country travel would contribute substantially to increase habitat effectiveness for little penstemon within the project area. Increased habitat effectiveness for little penstemon would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for little penstemon would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased

habitat effectiveness for the 6 percent of little penstemon habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual little penstemon plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect little penstemon include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on little penstemon in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on little penstemon in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on little penstemon in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to little penstemon and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual little penstemon plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Maguire campion (*Silene petersonii*)**

#### Direct and Indirect Effects

Maguire campion occurs on open calcareous escarpments and steep talus slopes of the Wasatch Limestone Formation and is found on the Cedar City, Powell, and Escalante Ranger Districts within the project area. From Table 2 above, we see that there is 32 percent occupied and potentially suitable habitat for Maguire campion that is currently within 500 feet of open routes in the project area. This is considered Maguire campion occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 25 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 7 percent reduction in Maguire campion occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Maguire campion individuals and suitable

habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Maguire campion as a result of implementing this proposed action.

From Table 3 above, cross country travel in Maguire campion occupied and potentially suitable habitat will be reduced from 62 percent to 5 percent under PAWM. Cross country travel will be reduced by 57 percent from Maguire campion occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 9.9 percent of the total sensitive plant habitat for all species within the project area). Maguire campion occurs on open calcareous escarpments, steep talus slopes and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse. Motorized vehicle access is only readily available on flat escarpments and areas that are not steep and unstable. Much of the habitat for Maguire campion is on steep and unstable slopes not suitable for motorized access. Therefore, a reduction of cross country travel would make a less substantial contribution to increase habitat effectiveness for Maguire campion within the project area. Increased habitat effectiveness for Maguire campion would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Maguire campion would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 7 percent of Maguire campion habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Maguire campion plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Maguire campion include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Maguire campion in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Maguire campion in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Maguire campion in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Maguire campion and its habitat have been disclosed for these activities and analyzed in the Cumulative

effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Maguire campion plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Navajo Lake milkvetch (*Astragalus limnocharis* var. *limnocharis*)**

#### **Direct and Indirect Effects**

Navajo Lake milkvetch is found in open cushion plant communities on the Wasatch Limestone Formation as is endemic to the west side of the Markagunt Plateau on the Cedar City Ranger District within the project area. From Table 2 above, we see that there is 60 percent occupied and potentially suitable habitat for Navajo Lake milkvetch that is currently within 500 feet of open routes in the project area. This is considered Navajo Lake milkvetch occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 23 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 37 percent reduction in Navajo Lake milkvetch occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Navajo Lake milkvetch individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Navajo Lake milkvetch as a result of implementing this proposed action.

From Table 3 above, cross country travel in Navajo Lake milkvetch occupied and potentially suitable habitat will be reduced from 92 percent to 8 percent under PAWM. Cross country travel will be reduced by 84 percent from Navajo Lake milkvetch occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 0.9 percent of the total sensitive plant habitat for all species within the project area). Navajo Lake milkvetch occurs on open escarpments and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for Navajo Lake milkvetch within the project area. Increased habitat effectiveness for Navajo Lake milkvetch would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Navajo Lake milkvetch would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities

would cause decreased habitat effectiveness for the 37 percent of Navajo Lake milkvetch habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Navajo Lake milkvetch plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Navajo Lake milkvetch include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Navajo Lake milkvetch in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Navajo Lake milkvetch in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Navajo Lake milkvetch in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Navajo Lake milkvetch and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Navajo Lake milkvetch plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### **Neese's peppergrass (*Lepidium montanum* var. *neeseae*)**

##### Direct and Indirect Effects

Neese's peppergrass is found on dry, sandy sites derived from Navajo Sandstone or Tertiary Claron Formation in open ponderosa pine, manzanita, pinyon pine, and spruce-fir plant communities. It occurs on the Escalante Ranger District within the project area. From Table 2 above, we see that 12 percent of occupied and potentially suitable habitat for Neese's peppergrass is currently within 500 feet of open routes in the project area. This is considered Neese's peppergrass occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of Neese's peppergrass occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Neese's peppergrass as a result of implementing this proposed action.

From Table 3 above, cross country travel in Neese's peppergrass occupied and potentially suitable habitat will be reduced from 24 percent to zero under PAWM. Cross country travel will be completely eliminated from Neese's peppergrass occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 3.1 percent of the total sensitive plant habitat for all species within the project area). Neese's peppergrass occurs in dry sandy open ponderosa pine, manzanita, pinyon pine, and spruce-fir communities. In many areas, this habitat is readily accessible to cross country motor vehicle use. Therefore, elimination of cross country travel would make a substantial contribution to increase habitat effectiveness for Neese's peppergrass within the project area. Increased habitat effectiveness for Neese's peppergrass would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Neese's peppergrass would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Neese's peppergrass plants or their habitat.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Neese's peppergrass include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Neese's peppergrass in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Neese's peppergrass in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on Neese's peppergrass in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Neese's peppergrass and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Neese's peppergrass plants or their habitat.

#### **Paradox moonwort (*Botrychium paradoxum*)**

##### Direct and Indirect Effects

Paradox moonwort is endemic to high elevation moist meadows and snowfields of the Aquarius Plateau on the Escalante and Teasdale Ranger Districts. From Table 2 above, we see that 100 percent of occupied and potentially suitable habitat for paradox moonwort is currently within 500 feet of open routes in the project area. This is considered paradox moonwort occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present

ongoing use). Under the proposed action (PAWM), the percentage of paradox moonwort occupied and potentially suitable habitat within 500 feet of open routes in the project area will not change. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to paradox moonwort as a result of implementing this proposed action.

From Table 3 above, cross country travel in paradox moonwort occupied and potentially suitable habitat will be reduced from 100 percent to zero under PAWM. Cross country travel will be entirely eliminated from paradox moonwort occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 0.3 percent of the total sensitive plant habitat for all species within the project area). The Aquarius Plateau is dominated by high elevation open wet and dry meadows with low-growing silver sagebrush, grasses, and forbs, interspersed with patches of Engelmann spruce, sub-alpine fir, and aspen. This open country lends itself to near continuous cross country travel. Therefore, elimination of cross country travel would contribute substantially to increase habitat effectiveness for paradox moonwort within the project area. Increased habitat effectiveness for paradox moonwort would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for paradox moonwort would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to paradox moonwort plants or their habitat.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect paradox moonwort include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on paradox moonwort in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on paradox moonwort in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on paradox moonwort in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Paradox moonwort and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to paradox moonwort plants or their habitat.



### **Pine Valley goldenweed (*Haplopappus crispus*)**

#### **Direct and Indirect Effects**

Pine Valley goldenweed is endemic to the Pine Valley Mountain Wilderness Area. It occurs in moderately open areas in ponderosa pine, fir, and aspen on the Pine Valley Ranger District within the project area. From Table 2 above, we see that there is no occupied and potentially suitable habitat for Pine Valley goldenweed that is currently within 500 feet of open routes in the project area. This is considered Pine Valley goldenweed occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will still be no occupied and potentially suitable habitat within 500 feet of open routes in the project area. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Pine Valley goldenweed as a result of implementing this proposed action.

From Table 3 above, cross country travel in Pine Valley occupied and potentially suitable habitat does not exist. Pine Valley goldenweed habitat in the project area is found entirely within the Pine Valley Mountain Wilderness. Since all motorized travel is already prohibited within the Pine Valley Mountain Wilderness, the PAWM will have no effect on cross country travel within Pine Valley goldenweed habitat. Since there will be no Pine Valley goldenweed occupied or potentially suitable habitat affected by PAWM, there will be no direct or indirect effects to Pine Valley goldenweed. Therefore, this proposed action would have no impact on Pine Valley goldenweed plants or their habitat.

#### **Cumulative Effects**

Since there are no direct or indirect effects to Pine Valley goldenweed, there will be no cumulative effects to Pine Valley goldenweed plants or their habitat from this proposed action.

### **Pinyon Penstemon (*Penstemon pinorum*)**

#### **Direct and Indirect Effects**

Pinyon penstemon occurs on the north end of the Pine Valley Mountains in pinyon-juniper on the Pine Valley Ranger District within the project area. From Table 2 above, we see that there is no occupied and potentially suitable habitat for pinyon penstemon that is currently within 500 feet of open routes in the project area. This is considered pinyon penstemon occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will still be no occupied and potentially suitable habitat within 500 feet of open routes in the project area. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to pinyon penstemon as a result of implementing this proposed action.

From Table 3 above, cross country travel in pinyon penstemon occupied and potentially suitable habitat will be reduced from 100 percent to 38 percent under PAWM. Cross country travel will

be reduced by 62 percent in pinyon penstemon occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.2 percent of the total sensitive plant habitat for all species within the project area). Pinyon penstemon occurs in pinyon-juniper plant communities on the north end of the Pine Valley Mountains. In many areas, this habitat is readily accessible to cross country motor vehicle use. Therefore, elimination of cross country travel would make a substantial contribution to increase habitat effectiveness for pinyon penstemon within the project area. Increased habitat effectiveness for pinyon penstemon would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for pinyon penstemon would result in both short and long-term beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to pinyon penstemon plants or their habitat.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect pinyon penstemon include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on pinyon penstemon in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on pinyon penstemon in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term beneficial impacts on pinyon penstemon in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to pinyon penstemon and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to pinyon penstemon plants or their habitat.

### **Podunk groundsel (*Senecio malmstenii*)**

#### Direct and Indirect Effects

Podunk groundsel occurs on open calcareous escarpments and steep talus slopes of the Wasatch Limestone Formation and is found on the Cedar City, Powell, and Escalante Ranger Districts within the project area. From Table 2 above, we see that 12 percent of occupied and potentially suitable habitat for Arizona willow is currently within 500 feet of open routes in the project area. This is considered Arizona willow occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), the percentage of Arizona willow occupied and potentially suitable habitat within 500 feet of open routes in the project area stays at 12 percent.

There is one motorized route that will be designated as open from a closed unauthorized status within occupied or potentially suitable habitat for Podunk groundsel. Under the PAWM, this route is either an existing user created route or proposed re-route (new construction). This single route will affect 4 percent of the occupied and potentially suitable habitat for Podunk groundsel. This percentage is already reflected and included in the 0 percent change above (this means that the PAWM reduced the open routes in Podunk groundsel habitat from 12 percent to 8 percent and then designated one existing user created route or proposed re-route to open increasing it 4 percent – from 8 back to 12 percent). The direct and indirect impacts for designating a user-created route as open or re-route construction activities would be a loss of Podunk groundsel individuals and their habitats in those areas from the destruction of plant individuals and from the effects for decreasing sensitive plant habitat effectiveness described in the Direct and indirect effects common to all sensitive plant species section above. These effects would be adverse and both short-term and long-term. This loss of occupied and potentially suitable habitat to Podunk groundsel would compromise these affected sensitive plant individuals and habitat in the short-term through removal and alteration and in the long-term from effects from decreasing habitat effectiveness from increased motorized use. These would include increasing habitat fragmentation, increased exposure to human disturbance, increased potential for noxious and invasive weed perpetuation and/or infestation, and a decline in the retention and development of soil.

From Table 3 above, cross country travel in Podunk groundsel occupied and potentially suitable habitat will be reduced from 64 percent to zero under PAWM. Cross country travel will be entirely eliminated from Podunk groundsel occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.8 percent of the total sensitive plant habitat for all species within the project area). Podunk groundsel occurs on open calcareous escarpments, steep talus slopes and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse. Motorized vehicle access is only readily available on flat escarpments and areas that are not steep and unstable. Much of the habitat for Podunk groundsel is on steep and unstable slopes not suitable for motorized access. Therefore, a reduction of cross country travel would make a less substantial contribution to increase habitat effectiveness for Podunk groundsel within the project area. Increased habitat effectiveness for Podunk groundsel would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail).

Both decreased habitat effectiveness from unauthorized route designation, construction, and decommissioning activities and increased habitat effectiveness for Podunk groundsel from a reduction in cross country travel would result in both short and long-term adverse and beneficial effects to this sensitive plant species. There will be no net change of Podunk groundsel habitat in areas within 500 feet of open routes. Decommissioning activities from the PAWM will have short-term adverse effects to Podunk groundsel individuals and habitat and long-term beneficial

effects (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Re-route construction and/or closed unauthorized designation to open on one motorized routes from the PAWM would have both short-term and long-term adverse effects to Podunk groundsel. The elimination of cross country travel on 64 percent of Podunk groundsel habitat would have beneficial effects. Therefore, this proposed action (PAWM) may impact individual Podunk groundsel plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Podunk groundsel include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Podunk groundsel in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Podunk groundsel in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Podunk groundsel in combination with the proposed action (PAWM) because there is no net change to motorized use within Podunk groundsel habitat on open routes (although decommissioning and construction activities would occur) and decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Podunk groundsel and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Podunk groundsel plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### **Rabbit Valley Gilia (*Gilia caespitosa*)**

##### Direct and Indirect Effects

Rabbit Valley Gilia is endemic to Wayne County on Navajo Sandstone and Carmel Limestone outcrops and occurs on the north end of the Teasdale Ranger District within the project area. From Table 2 above, we see that there is no occupied and potentially suitable habitat for Rabbit Valley Gilia that is currently within 500 feet of open routes in the project area. This is considered Rabbit Valley Gilia occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will still be no occupied and potentially suitable habitat within 500 feet of open routes in the project area. Therefore, no direct and indirect effects from open or closed routes changing motor vehicle use, decommissioning, or construction activities will occur to Rabbit Valley Gilia as a result of implementing this proposed action.

From Table 3 above, cross country travel in Rabbit Valley Gilia occupied and potentially suitable habitat will be reduced from 100 percent to 30 percent under PAWM. Cross country travel will be reduced by 70 percent from Rabbit Valley Gilia occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 2.2 percent of the total sensitive plant habitat for all species within the project area). Rabbit Valley Gilia occurs in rocky and sandy places on outcrops on the Navajo Sandstone and Carmel Formation. This habitat is in broken pinyon-juniper terrain where cross-country motorized travel would be difficult in the best of conditions. Therefore, a reduction of cross country travel would only make a minor contribution to increase habitat effectiveness for Rabbit Valley Gilia within the project area. Increased habitat effectiveness for Rabbit Valley Gilia would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Rabbit Valley Gilia would result in both short and long-term minor beneficial effects to this sensitive plant species. This proposed action would result in beneficial impacts to Rabbit Valley Gilia plants or their habitat.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Rabbit Valley Gilia include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Rabbit Valley Gilia in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Rabbit Valley Gilia in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term minor beneficial impacts on Rabbit Valley Gilia in combination with the proposed action (PAWM) because motorized use is decreased through the elimination of cross country travel under this proposed action. General cumulative effects to Rabbit Valley Gilia and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action in combination with these activities would result in beneficial impacts to Rabbit Valley Gilia plants or their habitat.

#### **Red Canyon beardtongue (*Penstemon bracteatus*)**

##### Direct and Indirect Effects

Red Canyon beardtongue occurs in open ponderosa pine, limber pine, bristlecone pine, sparsely vegetated cushion plant communities, and open escarpments of the Wasatch Limestone Formation on the Powell and Escalante Ranger Districts within the project area. From Table 2 above, we see that there is 24 percent occupied and potentially suitable habitat for Red Canyon beardtongue that is currently within 500 feet of open routes in the project area. This is

considered Red Canyon beardtongue occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 15 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 9 percent reduction in Red Canyon beardtongue occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Red Canyon beardtongue individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Red Canyon beardtongue as a result of implementing this proposed action.

From Table 3 above, cross country travel in Red Canyon beardtongue occupied and potentially suitable habitat will be reduced from 45 percent to 3 percent under PAWM. Cross country travel will be reduced by 42 percent from Red Canyon beardtongue occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 7.6 percent of the total sensitive plant habitat for all species within the project area). Red Canyon beardtongue occurs in open ponderosa pine/mixed conifer, on escarpments, and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for Red Canyon beardtongue within the project area. Increased habitat effectiveness for Red Canyon beardtongue would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Red Canyon beardtongue would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 9 percent of Red Canyon beardtongue habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Red Canyon beardtongue plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Red Canyon beardtongue include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing

would have short and long-term beneficial cumulative impacts on Red Canyon beardtongue in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Red Canyon beardtongue in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Red Canyon beardtongue in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Red Canyon beardtongue and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Red Canyon beardtongue plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Reveal Paintbrush (*Castilleja parvula* var. *revealii*)**

#### **Direct and Indirect Effects**

Reveal paintbrush occurs in open ponderosa pine, limber pine, bristlecone pine, sparsely vegetated cushion plant communities, and open escarpments of the Wasatch Limestone Formation on the Cedar City, Powell, and Escalante Ranger Districts within the project area. From Table 2 above, we see that there is 29 percent occupied and potentially suitable habitat for Reveal paintbrush that is currently within 500 feet of open routes in the project area. This is considered Reveal paintbrush occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 22 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 7 percent reduction in Reveal paintbrush occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Reveal paintbrush individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Reveal paintbrush as a result of implementing this proposed action.

From Table 3 above, cross country travel in Reveal paintbrush occupied and potentially suitable habitat will be reduced from 76 percent to 3 percent under PAWM. Cross country travel will be reduced by 73 percent from Reveal paintbrush occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 4.8 percent of the total sensitive plant habitat for

all species within the project area). Reveal paintbrush occurs in open ponderosa pine, on escarpments, and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for Reveal paintbrush within the project area. Increased habitat effectiveness for Reveal paintbrush would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Reveal paintbrush would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 7 percent of Reveal paintbrush habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Reveal paintbrush plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Reveal paintbrush include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Reveal paintbrush in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Reveal paintbrush in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Reveal paintbrush in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Reveal paintbrush and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Reveal paintbrush plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Rock tansy (*Sphaeromeria capitata*)**

#### Direct and Indirect Effects

Rock tansy has disjunct populations in Garfield County in open ponderosa pine, limber pine, bristlecone pine, and sparsely vegetated cushion plant communities of the Wasatch Limestone



Formation on the Powell Ranger District within the project area. From Table 2 above, we see that there is 63 percent occupied and potentially suitable habitat for rock tansy that is currently within 500 feet of open routes in the project area. This is considered rock tansy occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 42 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 21 percent reduction in rock tansy occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of rock tansy individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to rock tansy as a result of implementing this proposed action.

From Table 3 above, cross country travel in rock tansy occupied and potentially suitable habitat will be reduced from 100 percent to 25 percent under PAWM. Cross country travel will be reduced by 75 percent from rock tansy occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 1.7 percent of the total sensitive plant habitat for all species within the project area). Rock tansy occurs in open ponderosa pine, on escarpments, and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for rock tansy within the project area. Increased habitat effectiveness for rock tansy would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for rock tansy would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 21 percent of rock tansy habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual rock tansy plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect rock tansy include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing.

Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on rock tansy in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on rock tansy in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on rock tansy in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to rock tansy and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual rock tansy plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### **Table Cliff milkvetch (*Astragalus limnocharis* var. *tabulaeus*)**

##### **Direct and Indirect Effects**

Table Cliff milkvetch is endemic to Garfield County and occurs on steep and unstable talus slopes of the Wasatch Limestone Formation along the margins of the Table Cliff Plateau, Horse Creek Top, Griffin Top and Barney Top of the Escalante Ranger District within the project area. From Table 2 above, we see that there is 19 percent occupied and potentially suitable habitat for Table Cliff milkvetch that is currently within 500 feet of open routes in the project area. This is considered Table Cliff milkvetch occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 16 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 3 percent reduction in Table Cliff milkvetch occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Table Cliff milkvetch individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Table Cliff milkvetch as a result of implementing this proposed action.

From Table 3 above, cross country travel in Table Cliff milkvetch occupied and potentially suitable habitat will be reduced from 81 percent to zero under PAWM. Cross country travel will be entirely eliminated from Table Cliff milkvetch occupied and potentially suitable habitat

affected by cross country travel (this habitat constitutes 2.3 percent of the total sensitive plant habitat for all species within the project area). Table Cliff milkvetch occurs on open calcareous escarpments, steep talus slopes and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse. Motorized vehicle access is only readily available on flat escarpments and areas that are not steep and unstable. Much of the habitat for Table Cliff milkvetch is on steep and unstable slopes not suitable for motorized access. Therefore, a reduction of cross country travel would make a less substantial contribution to increase habitat effectiveness for Table Cliff milkvetch within the project area. Increased habitat effectiveness for Table Cliff milkvetch would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Table Cliff milkvetch would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 3 percent of Table Cliff milkvetch habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Table Cliff milkvetch plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

#### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Table Cliff milkvetch include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Table Cliff milkvetch in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Table Cliff milkvetch in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Table Cliff milkvetch in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Table Cliff milkvetch and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Table Cliff milkvetch plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Widtsoe buckwheat (*Eriogonum aretioides*)**

#### **Direct and Indirect Effects**

Widtsoe buckwheat is endemic to central Garfield County in open ponderosa pine, limber pine, bristlecone pine, and sparsely vegetated cushion plant communities of the Wasatch Limestone Formation on the Powell and Escalante Ranger Districts within the project area. From Table 2 above, we see that there is 19 percent occupied and potentially suitable habitat for Widtsoe buckwheat that is currently within 500 feet of open routes in the project area. This is considered Widtsoe buckwheat occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 15 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents a 4 percent reduction in Widtsoe buckwheat occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of Widtsoe buckwheat individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to Widtsoe buckwheat as a result of implementing this proposed action.

From Table 3 above, cross country travel in Widtsoe buckwheat occupied and potentially suitable habitat will be reduced from 53 percent to 13 percent under PAWM. Cross country travel will be reduced by 50 percent from Widtsoe buckwheat occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 4.9 percent of the total sensitive plant habitat for all species within the project area). Widtsoe buckwheat occurs in open ponderosa pine, on escarpments, and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for Widtsoe buckwheat within the project area. Increased habitat effectiveness for Widtsoe buckwheat would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for Widtsoe buckwheat would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 4 percent of Widtsoe buckwheat habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual Widtsoe buckwheat plants or their habitat, but

it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect Widtsoe buckwheat include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on Widtsoe buckwheat in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on Widtsoe buckwheat in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on Widtsoe buckwheat in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to Widtsoe buckwheat and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of this proposed action (PAWM) in combination with these activities may impact individual Widtsoe buckwheat plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### **Yellow-white catseye (*Cryptantha ochroleuca*)**

#### Direct and Indirect Effects

Yellow-white catseye occurs in open ponderosa pine, limber pine, bristlecone pine, and sparsely vegetated cushion plant communities of the Wasatch Limestone Formation on the Powell and Escalante Ranger Districts within the project area. From Table 2 above, we see that there is 33 percent occupied and potentially suitable habitat for yellow-white catseye that is currently within 500 feet of open routes in the project area. This is considered yellow-white catseye occupied and potentially suitable habitat that will be affected by routes in the no action alternative (present ongoing use). Under the proposed action (PAWM), there will be 25 percent occupied and potentially suitable habitat within 500 feet of open routes in the project area. This represents an 8 percent reduction in yellow-white catseye occupied and potentially suitable habitat affected by open routes within the project area. This reduction would increase habitat effectiveness in the long-term by decreasing habitat fragmentation, exposure to human disturbance, and potential for noxious weed and invasive weedy plants. It would also contribute to the retention and development of soils. This reduction would decrease habitat effectiveness in the short-term from decommissioning activities caused by the temporary destruction and alteration of yellow-white catseye individuals and suitable habitat where decommissioning activities occur. These effects would be short-term because once a route is actively decommissioned, it would be allowed to

naturally reclaim and there would be no more motorized use. Therefore, direct and indirect effects from open or closed routes changing motor vehicle use and decommissioning activities will occur to yellow-white catseye as a result of implementing this proposed action.

From Table 3 above, cross country travel in yellow-white catseye occupied and potentially suitable habitat will be reduced from 63 percent to 7 percent under PAWM. Cross country travel will be reduced by 56 percent from yellow-white catseye occupied and potentially suitable habitat affected by cross country travel (this habitat constitutes 8.7 percent of the total sensitive plant habitat for all species within the project area). Yellow-white catseye occurs in open ponderosa pine, on escarpments, and in open cushion plant communities of the Wasatch Limestone Formation where vegetation is sparse and motorized vehicle access is readily available. This habitat lends itself to cross country travel. Therefore, a reduction of cross country travel would make a substantial contribution to increase habitat effectiveness for yellow-white catseye within the project area. Increased habitat effectiveness for yellow-white catseye would result from reducing habitat fragmentation, reducing this plant species' exposure to human disturbance, reducing the potential for invasive weeds, and contributing to the retention and development of soil (see discussion on Direct and indirect effects common to all sensitive plant species analyzed above for further detail). Increased habitat effectiveness for yellow-white catseye would result in long-term beneficial effects to this sensitive plant species. In the short-term, decommissioning activities would cause decreased habitat effectiveness for the 8 percent of yellow-white catseye habitat in which decommissioning activities would occur. This proposed action (PAWM) may impact individual yellow-white catseye plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

### Cumulative Effects

Past, present, and reasonably foreseeable activities listed above that may affect yellow-white catseye include utilities, oil and gas and other mineral developments, transportation, recreation, vegetation treatments, land exchanges and easements, special use permits, and grazing. Activities from recreation, vegetation treatments, special use permits, and grazing would have short and long-term beneficial cumulative impacts on yellow-white catseye in combination with the proposed action (PAWM). Activities from utilities, oil and gas and other mineral developments, and land exchanges and easements would have no impact on yellow-white catseye in combination with the proposed action (PAWM). Activities from transportation projects would have short-term and long-term adverse and beneficial impacts on yellow-white catseye in combination with the proposed action (PAWM). This would occur because decommissioning activities would cause a decline in habitat effectiveness in the short-term and an increase in habitat effectiveness in the long-term through the reduction of motor vehicle use on open routes and through the elimination of cross country travel under this proposed action. General cumulative effects to yellow-white catseye and its habitat have been disclosed for these activities and analyzed in the Cumulative effects common to all sensitive plant species that have direct and indirect effects section above. Refer to this section for further detail. The effects of

this proposed action (PAWM) in combination with these activities may impact individual yellow-white catseye plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

## VII. Management Recommendation

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Prior to implementation, a site-specific review of known occupied and potentially suitable sensitive plant habitats will occur in determining the appropriate technique for decommissioning each route.

## VIII. Compliance with Management Direction

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This biological evaluation process has served to review the potential effects to sensitive plant species as a result of the **Motorized Travel Plan Preferred Alternative with Modifications (PAWM)** project on the Dixie National Forest. The effects of the proposed action are in compliance with the current management direction outlined above and in species recovery plans.

The PAWM would result in the closure of motorized cross country travel. This PAWM provides a mechanism to achieve objectives in the following conservation agreements and strategies: *Salix arizonica* Conservation Agreement and Strategy (USDAFS 1995), *Castilleja aquariensis* Conservation Agreement and Strategy (USDAFS 1996), Conservation Assessment, Strategy and Agreement for Sensitive Plant Species in the Red Canyon Area Dixie National Forest to include: *Castilleja parvula* var. *revealii*, *Cryptantha ochroleuca*, *Cymopterus minimus*, *Eriogonum aretoides*, *Lepidium montanum* var. *claronense*, *Penstemon bracteatus* and *Silene petersonii* (USDAFS 2000). *Penstemon pinorum* Conservation Assessment, Strategy, and agreement (USDAFS 2003). Each conservation strategy expresses the need to control off road recreational use and user created roads.

## IX. Determination

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As a result of this evaluation, it is my professional determination that implementation of the **Motorized Travel Plan Preferred Alternative with Modifications (PAWM)** project on the Dixie National Forest may impact individual Arizona willow, Cedar Breaks biscuitroot, little penstemon, Maguire campion, Navajo Lake milkvetch, Podunk groundsel, Red Canyon beardtongue, Reveal paintbrush, rock tansy, Table Cliff milkvetch, Widtsoe buckwheat, and yellow-white catseye plants or their habitat, but it would not cause a loss of persistence to the species and would not result in a trend towards federal listing.

As a result of this evaluation, it is my professional determination that implementation of the **Motorized Travel Plan Preferred Alternative with Modifications (PAWM)** project on the Dixie National Forest would result in beneficial impacts to Angell cinquefoil, Aquarius paintbrush, Bicknell thelesperma, pinnate spring-parsley, Dana milkvetch, guard milkvetch, Jones goldenaster, Neese's peppergrass, paradox moonwort, pinyon penstemon, and Rabbit Valley Gilia plants or their habitat.

As a result of this evaluation, it is my professional determination that implementation of the **Motorized Travel Plan Preferred Alternative with Modifications (PAWM)** project on the Dixie National Forest would have no impact on cliff Jamesia, creeping Draba, Paria breadroot, Pine Valley goldenweed, and Tushar paintbrush plants or their habitat.

## **X. Literature Cited**

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## **XI. Contributors**

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